

# Economic Value of Iowa's Natural Resource Amenities

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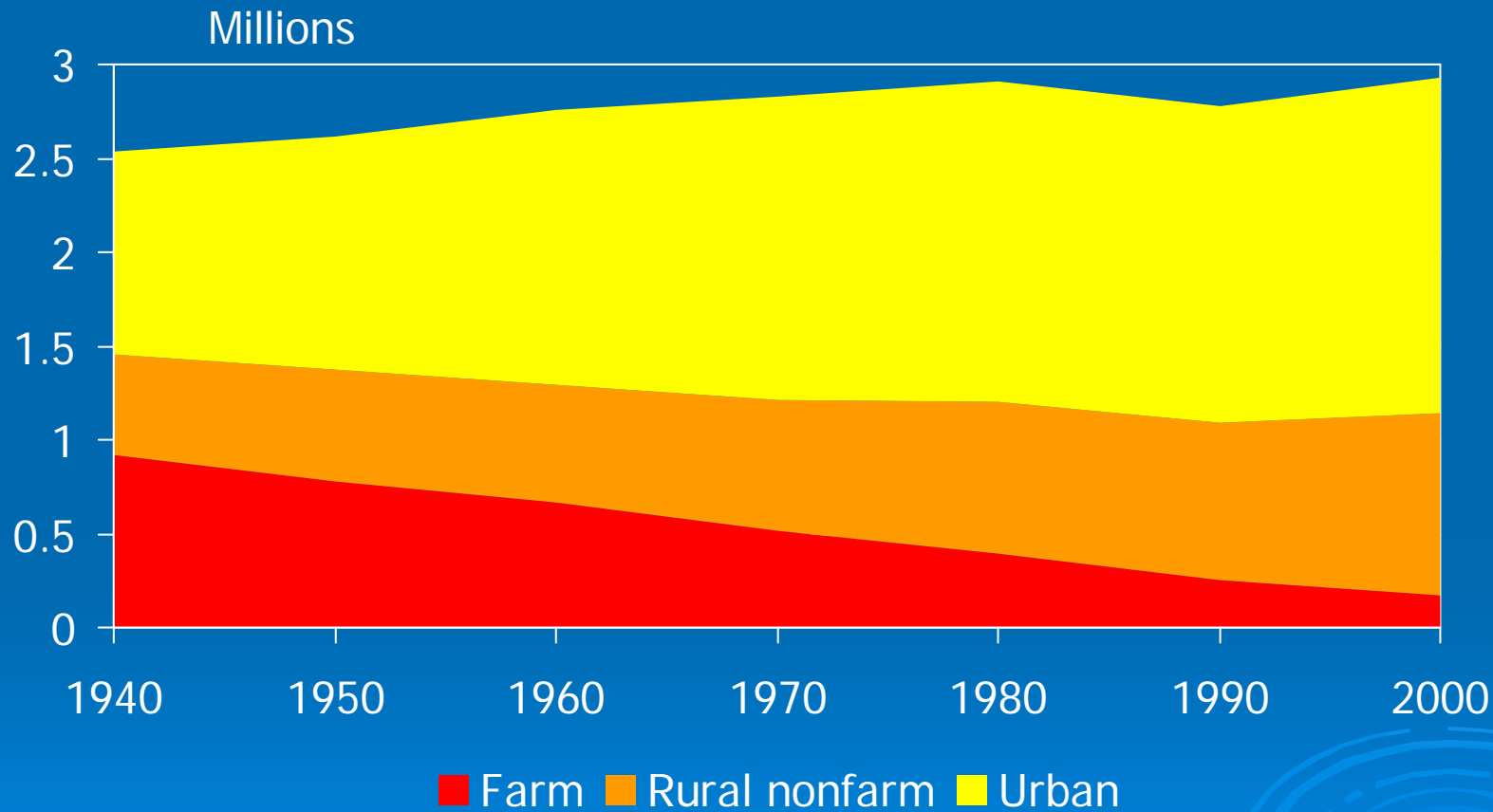
# Study Objectives

- Inventory Iowa's Outdoor Recreational Amenities and current usage levels
- Estimate economic value of these resources
  - Travel expenditure approach
  - Net Economic Benefits
- Estimate benefits of new investments
  - Soil erosion control
  - Expanded and enhanced outdoor amenities

# Changing Demographics of Iowa

- Iowa becoming an urbanized state
- Very small public land area
- Agriculture is important industry in rural Iowa
- 88.7% land area is privately owned farmland
- Natural resources and recreation also an important rural industry

# Rural, Urban and Farm Population in Iowa



# Iowa's Surface Area, Land Cover



## Classification of Iowa Surface Area

	(acres)	(%)
Agriculture	26,750,006	74.3
Ungrazed Grassland	4,932,370	13.7
Forest	2,844,213	7.9
Developed lands	1,152,086	3.2
Wetlands and surface water	504,037	1.4
Public lands	818,369	2.27
Total acres	36,002,705	



# Iowa's Natural Resources Inventory



# Iowa's Natural Resources for Recreation

- Lakes
- State Parks
- County Parks
- Multi-use trails
- State Forests and Preserves
- Wildlife Management Areas
- Rivers



# Iowa Lakes Valuation Project

- Collaborative project involving economists and ecologists studying Iowa lakes
- Builds off of existing 5 year study of the ecological conditions of 132 lakes in Iowa (2000-2004)
- Downing's team measures water clarity, chlorophyll, nitrogen and phosphorus, pH, suspended solids, dissolved organic carbon, etc.
- EPA Star grant augments work begun with Iowa DNR funding and CARD support – 4 year project

# Overview of Benefit Measurements

- A four-year panel data set of survey responses collected involving
  - Actual trip behavior, years 2001-2006
  - 2<sup>nd</sup> through 4<sup>th</sup> year survey contains water quality scenarios measuring WTP for quality improvements
  - Knowledge and perceptions regarding lake quality
- Estimate demand for and value of improved water quality in Iowa's lakes
- Also conducted consumer surveys of visitors to 2 Iowa lakes

# Measuring Benefits of Iowa Lakes

- Maximum Willingness to Pay  
Represents maximum amount an individual will pay for a certain level of water quality improvement, representing the value of goods willing to forgo for more of this “commodity”
- We want to quantify the tradeoffs people are willing to make to get improved water quality and compare these to the tradeoffs required
- Use observed patterns in lake usage to infer WTP for water quality
- Local economic **impact** does not measure these tradeoffs, useful for other purposes, but not cost-benefit assessments

# Iowa Lakes and Variation in Lake Usage

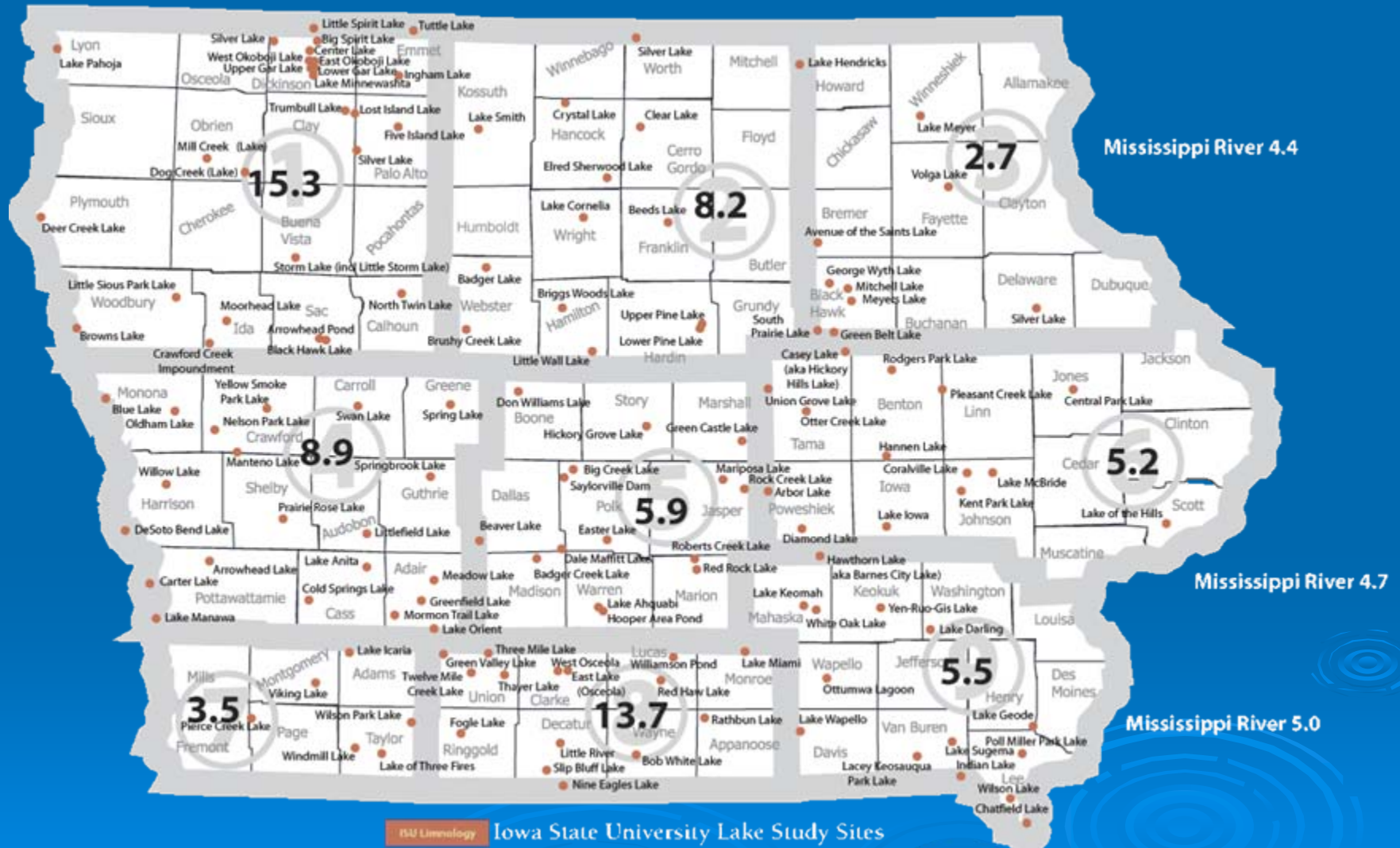
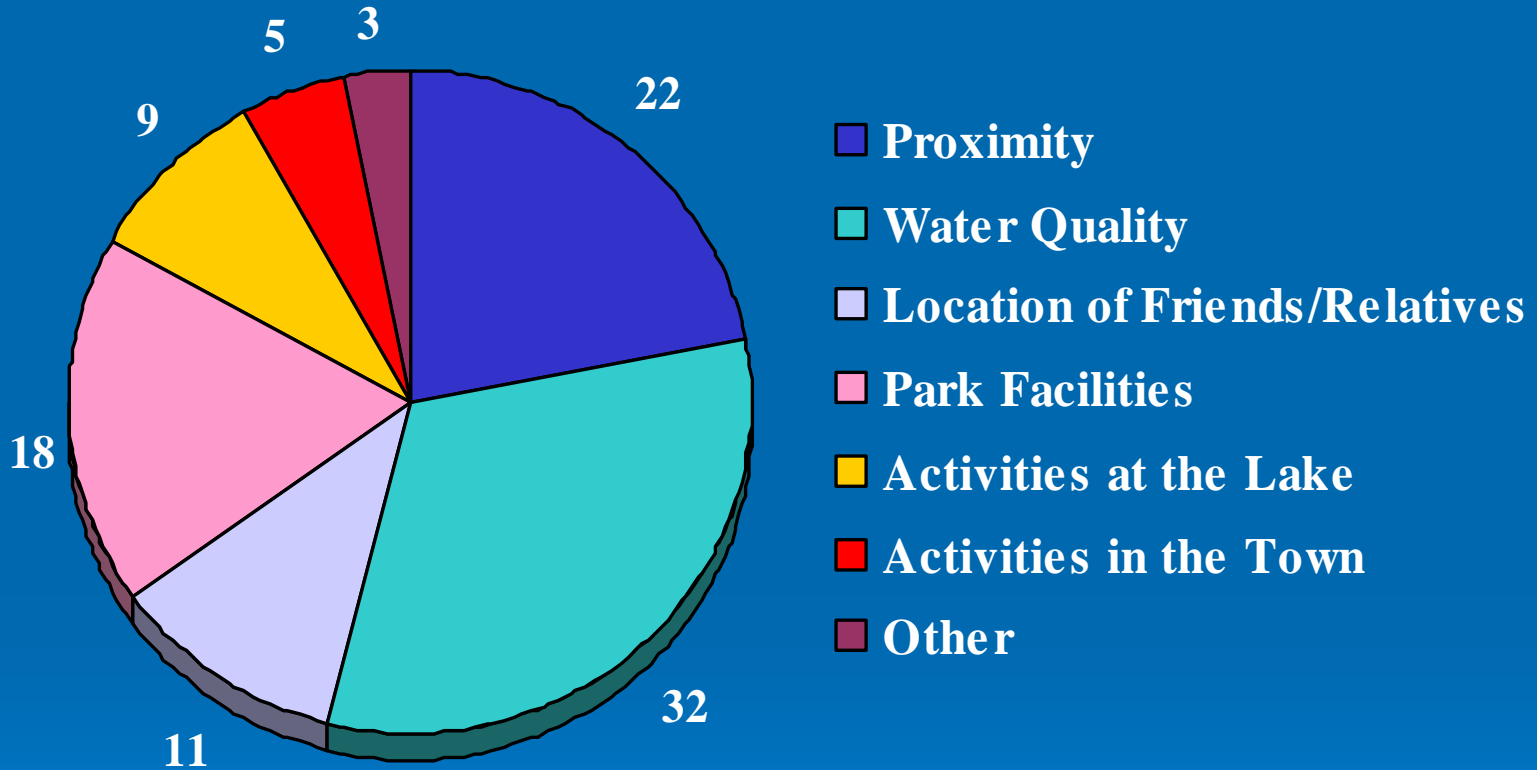


Figure 3: Average allocation of importance points to factors important in choosing a lake for recreation





# Iowa Lakes

- 132 lakes
- 11.16 million visits
  - 9.35 million day visits
  - 1.8 million overnight visits
- \$977 million of annual spending

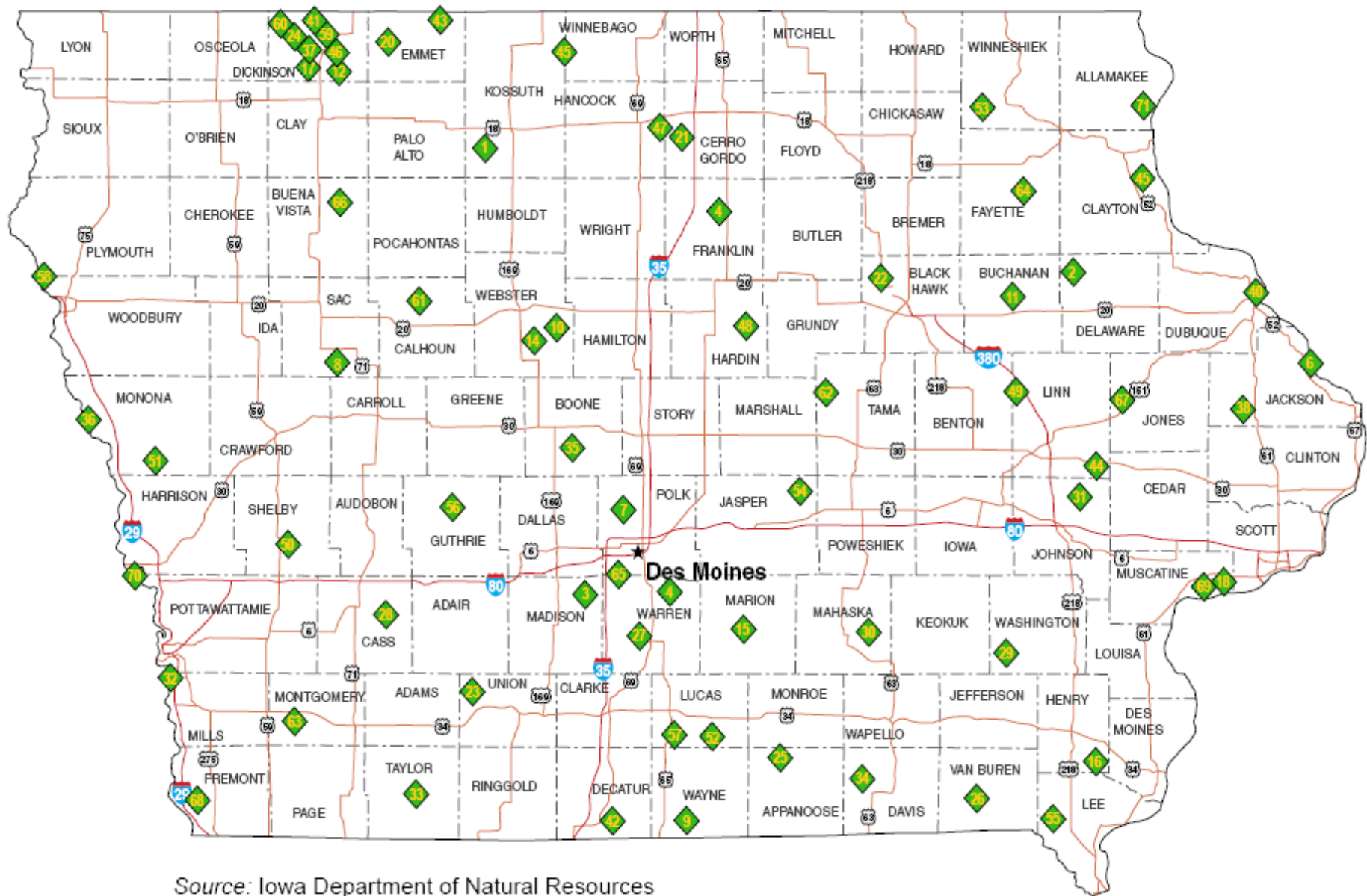


# Iowa's State Parks

- 85 state parks---89,318 acres
  - 68 DNR managed,
  - 17 county managed
- Visitor counts from 55 parks
  - 14.1 million visits
  - 701,000 campers
- \$747.9 million in spending



# Iowa State Parks



# County Parks

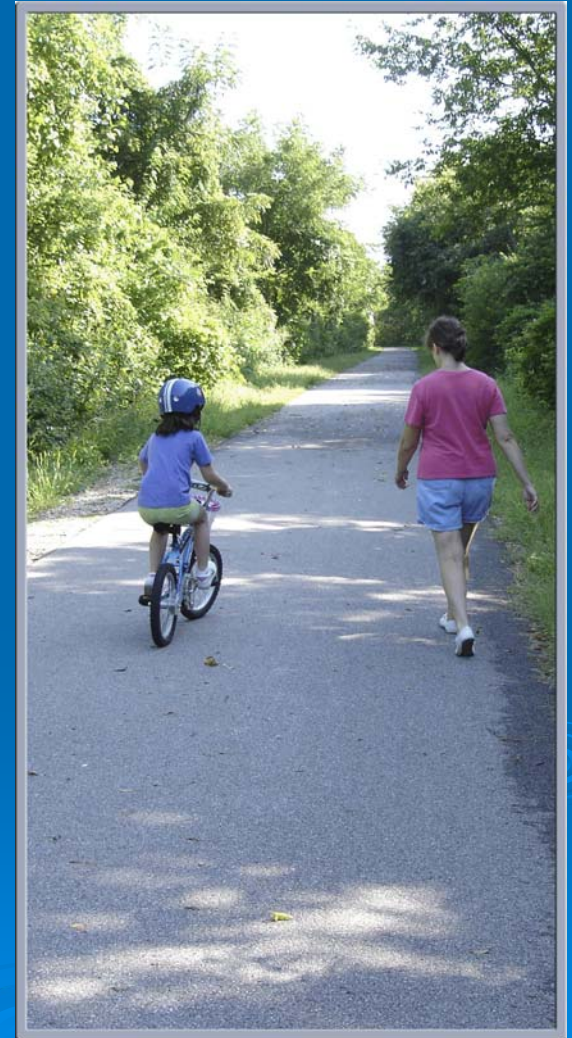
- 1722 individual parks
- 176,385 acres
- Estimated 23.6 million visitors
  - Polk and Linn Counties estimated county park visits
  - Non-metro county visits assumed similar to state parks
- \$897.1 million of expenditures
  - Assumes spending at county parks .5 of state parks





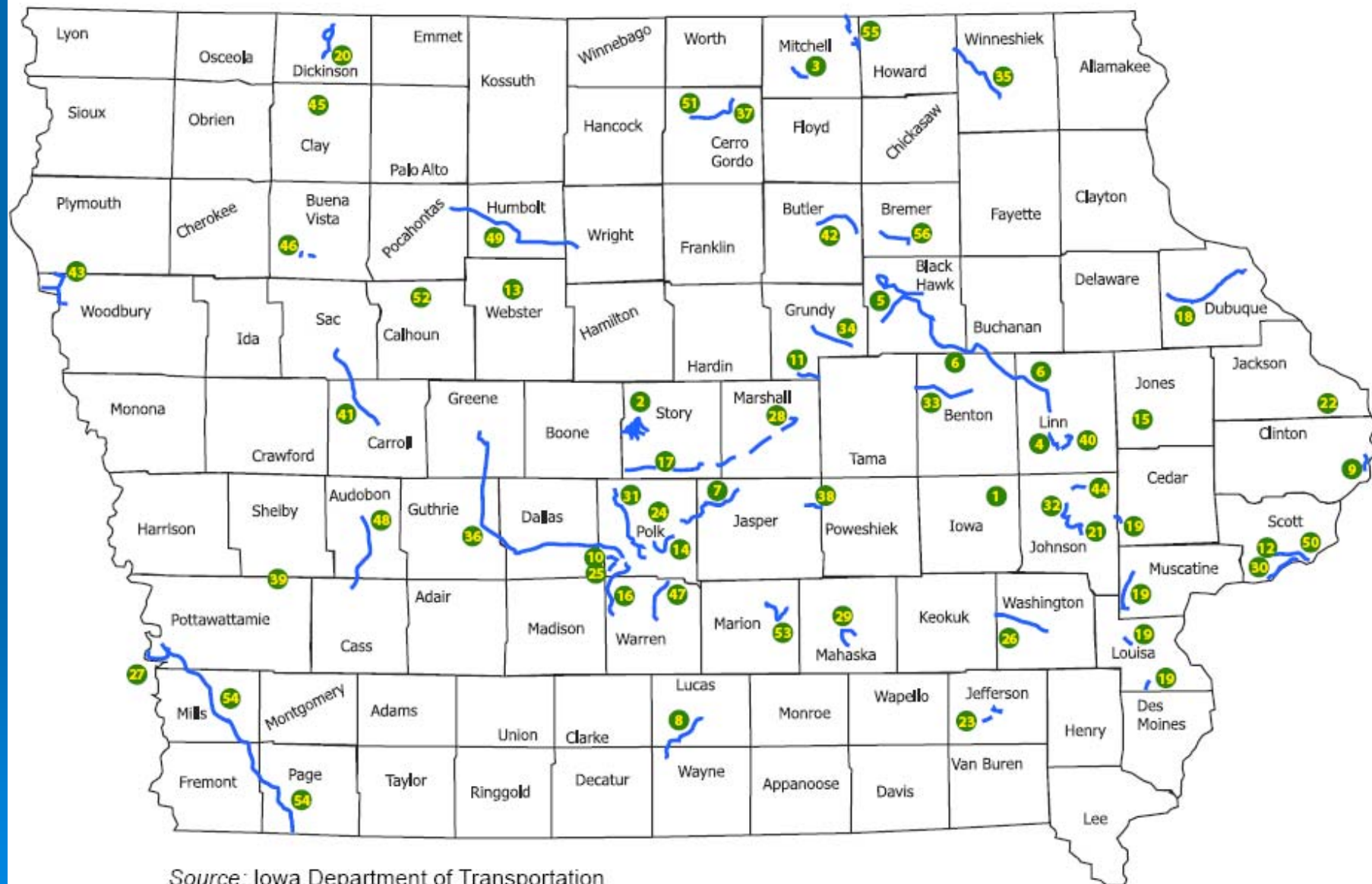
# Multi-Purpose Trails

- 890 miles, 56 different trails
- 1.4 million users
- \$10.9 million in expenditures





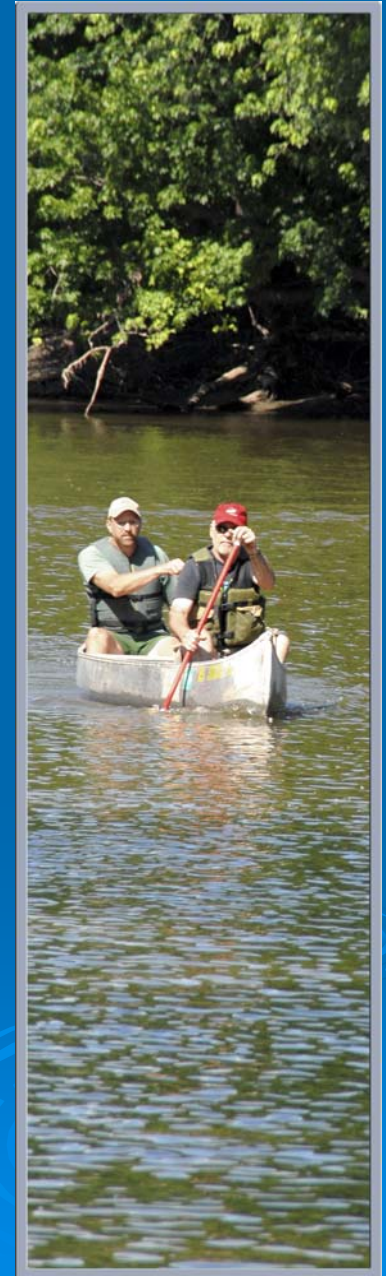
# Multi-Use Trails in Iowa



Source: Iowa Department of Transportation

# Mississippi River

Table E River				
	Iowa (\$2006)			
Activity	Expenditures	Output	Jobs	Job Income
Wildlife Observation	40,852	49,984	1	10,821
Small game hunting	127,602	157,794	2	36,319
Big game hunting	1,156,693	1,428,355	18	322,963
Migratory bird hunting	7,531,339	9,223,864	114	2,067,504
Fishing	8,829,213	10,762,695	123	2,303,119
Refuge Totals	18,720,378	22,887,904	277	5,013,569
<b>Total</b>	<b>36,406,077</b>	<b>44,510,597</b>	<b>534</b>	<b>9,754,295</b>



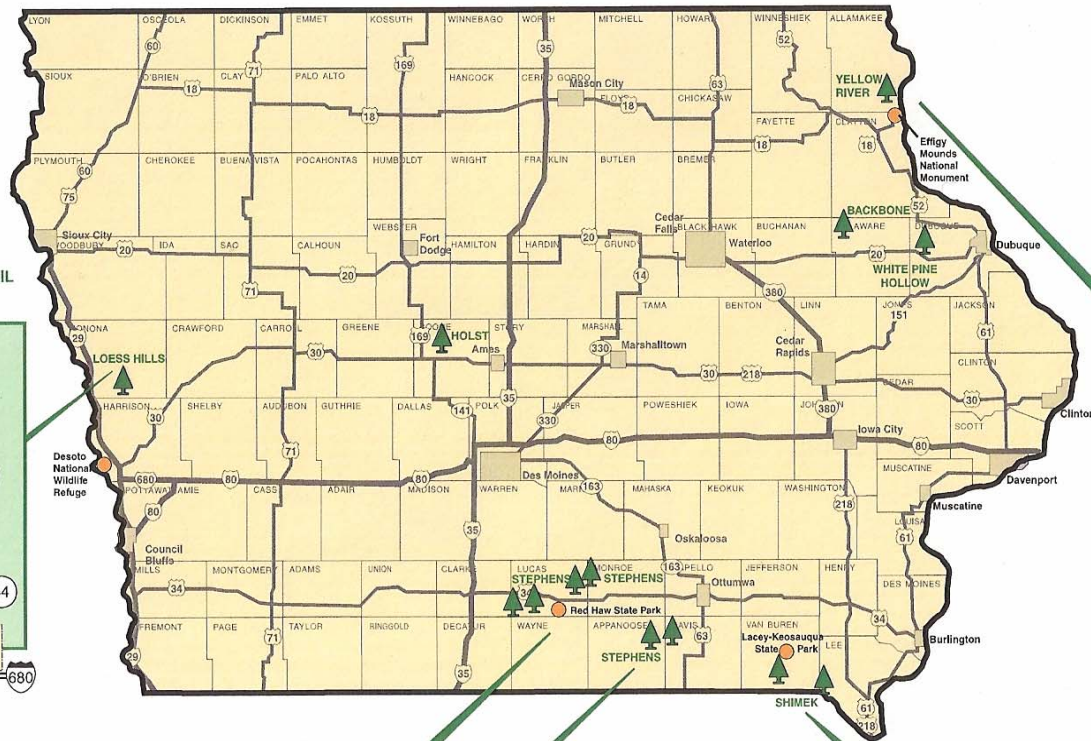
# State Forests, Preserves, and Wildlife Management Areas

- 43,500 acres of forest land
- 270,000 acres of WMAs, 340 sites

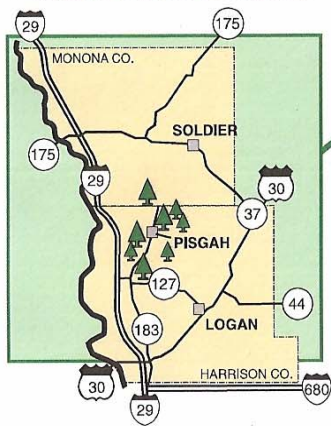




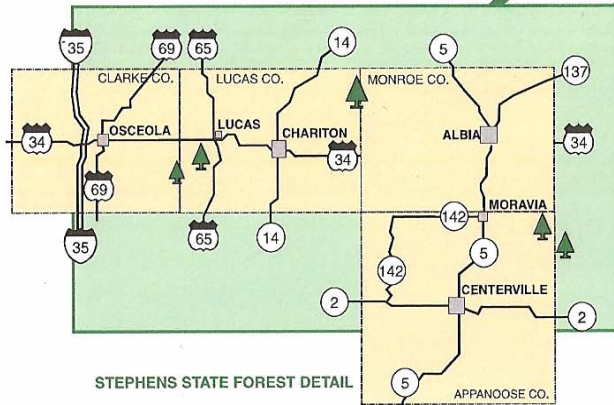
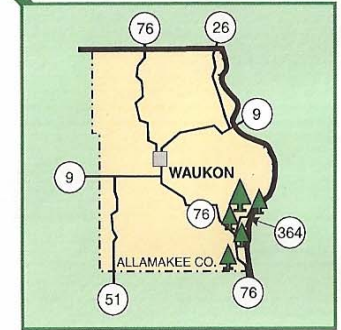
# State Forests in Iowa



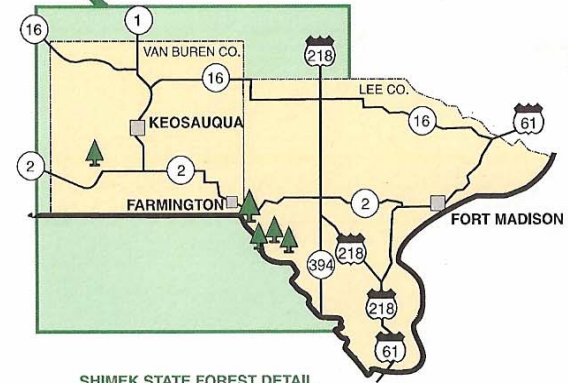
LOESS HILLS STATE FOREST DETAIL



YELLOW RIVER STATE FOREST DETAIL



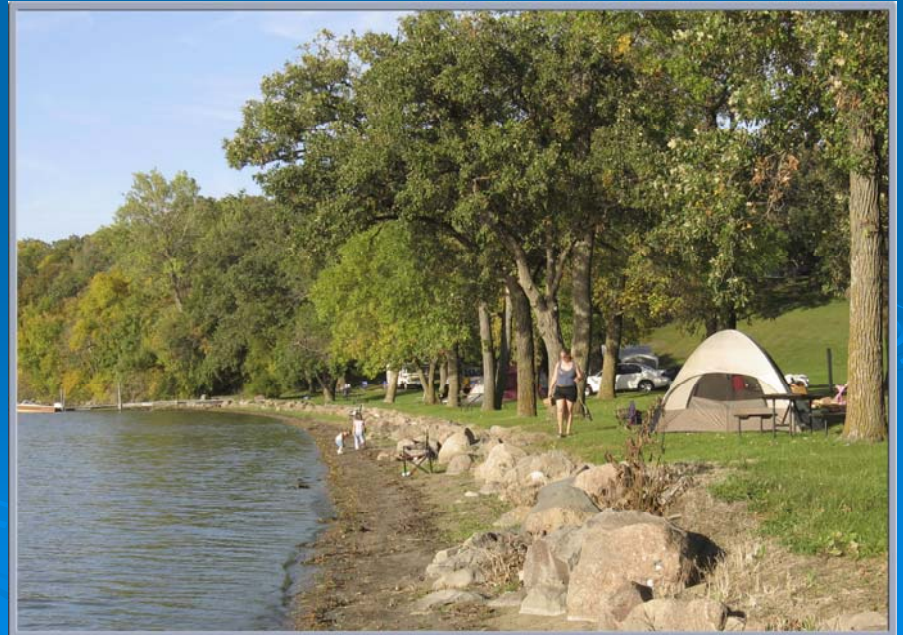
STEPHENS STATE FOREST DETAIL



SHIMEK STATE FOREST DETAIL

# Local Parks and Amenities

- Local governments and state supported parks and trail facilities
- REAP funded projects





# Valuation of Recreation Resources

- Total Expenditures Impacts
- Net Economic Benefits
- Economic Development
- Recruiting and Retaining skilled workers

## Total Estimated Annual Economic Impacts of Recreational Expenditures in Iowa, 2006

<b>Amenity</b>	<b>Total Sales</b>	<b>Labor Income</b>	<b>Value Added to GDP</b>	<b>Jobs</b>
Lakes	\$1,547,685,095	\$242,881,269	\$424,936,080	11,479
State Parks	\$1,184,694,653	\$185,916,464	\$325,272,566	8,787
County Parks	\$1,420,448,889	\$222,913,840	\$390,001,807	10,536
Trails	\$17,296,542	\$2,714,380	\$4,748,979	128
Totals	\$4,170,125,179	\$654,425,953	\$1,144,959,432	30,930

# Hunting, Fishing, Wildlife Viewing

		Expenditures (thousands of dollars)	Number of Participants (thousands)	Number of days (thousands)
Wildlife Watchers				
	Total	304,209	1,206	4,016
	Resident			3,654
	Nonresident			362
Anglers				
	Total	313,234	447	6,241
	Resident			6,084
	Nonresident			157
Hunters				
	Total	296,500	213	3,912
	Resident			3,691
	Nonresident			221

# Estimates of Economic Benefit by day of Recreational Activity, \$2004

Estimates based on Intermountain and Northeast regions

Activity	Average	Std. Dev	min	max	# studies
Boating (non-powered)	72.12	64.56	2.70	316.40	28
Boating (powered)	46.48	60.80	3.78	203.61	10
Camping	34.20	27.17	2.03	116.67	31
Fishing	39.57	47.08	2.08	253.13	117
General Recreation	39.17	62.55	1.97	257.51	17
Hunting	48.07	36.11	2.60	250.89	196
Mountain Biking	163.97	106.63	40.93	295.70	7
Swimming	23.13	15.27	2.18	50.10	8
Wildlife Viewing	34.17	22.03	2.40	193.91	126

# Aggregate Valuation of Recreation Activities in Iowa

Estimates of Net Economic Benefit by Activity in Iowa  
based on studies from the following regions (in 2007 dollars):

Activity	IA Usage (Day Equivalents)	Intermountain and Northeast	Northeast	Intermountain
Camping		\$ 52,748,685	\$ 51,067,514	\$ 53,550,712
Fishing	6,241,000	\$ 271,599,851	\$ 225,887,064	\$ 340,237,671
Hunting	3,912,000	\$ 206,815,109	\$ 204,147,637	\$ 208,923,272
Trail Use	1,400,000	\$ 41,479,635	\$ 41,479,635	\$ 41,479,635
Wildlife Viewing General Recreation/	4,016,000	\$ 150,920,411	\$ 138,200,165	\$ 164,435,671
Park Use	25,928,455	\$ 1,116,964,849	\$ 892,260,151	\$1,061,644,149
<b>Total</b>		<b>\$ 1,840,528,540</b>	<b>\$ 1,553,042,166</b>	<b>\$1,870,271,111</b>



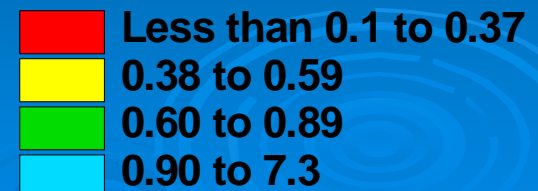
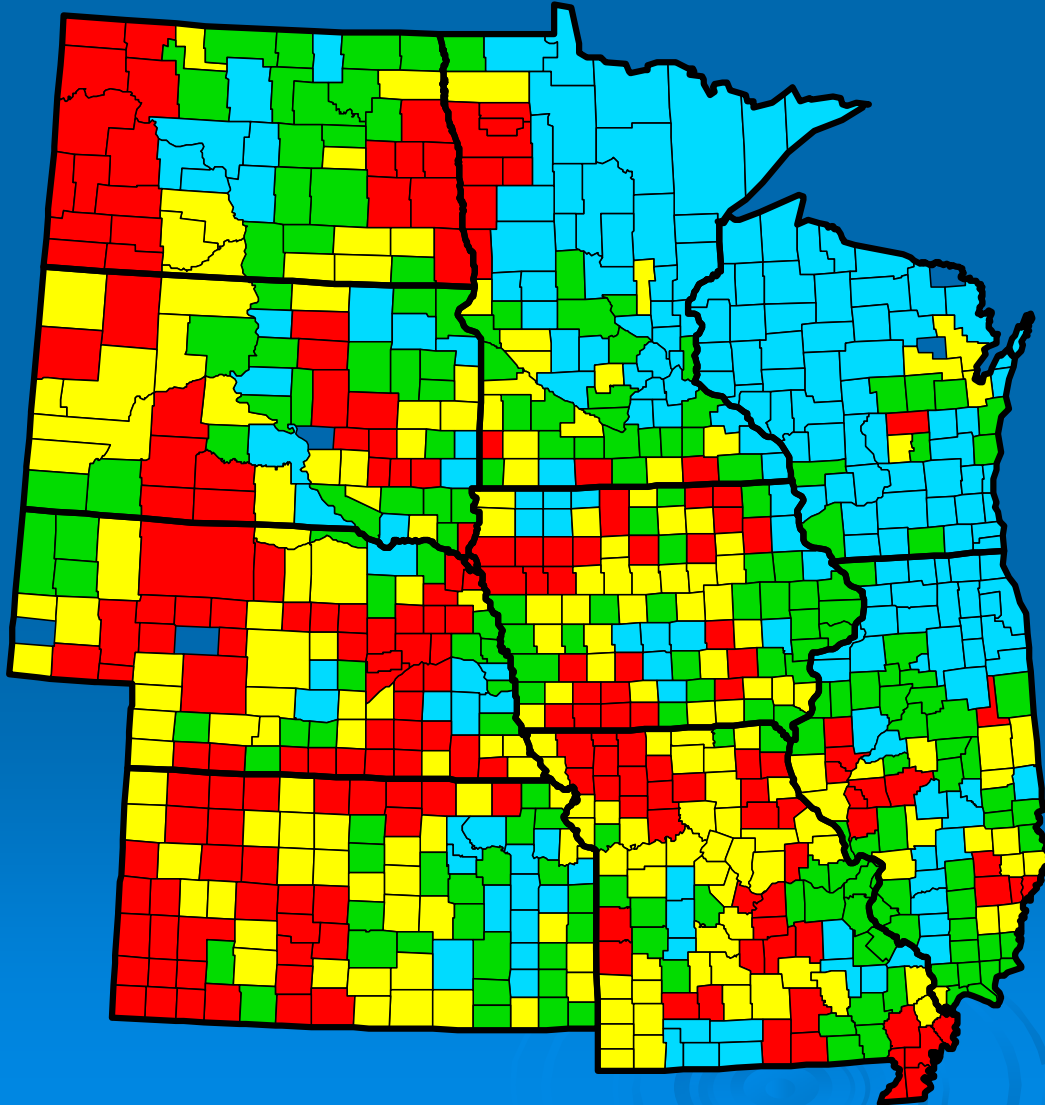
# Amenities, Human Capital, and Economic Growth

- Gootlieb, 2004 “Labor Supply Pressures and the Brain Drain, Signs from Census 2000”
  - Young educated workers prefer high amenity places
  - Amenities complement a human capital strategy for economic growth
  - Amenities are necessary, but not sufficient for tech-based economic growth

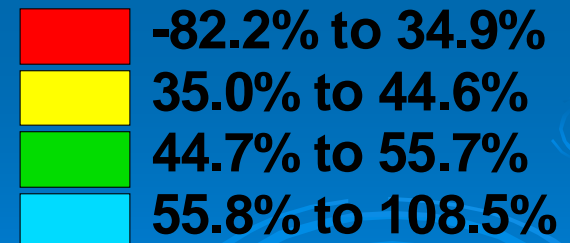
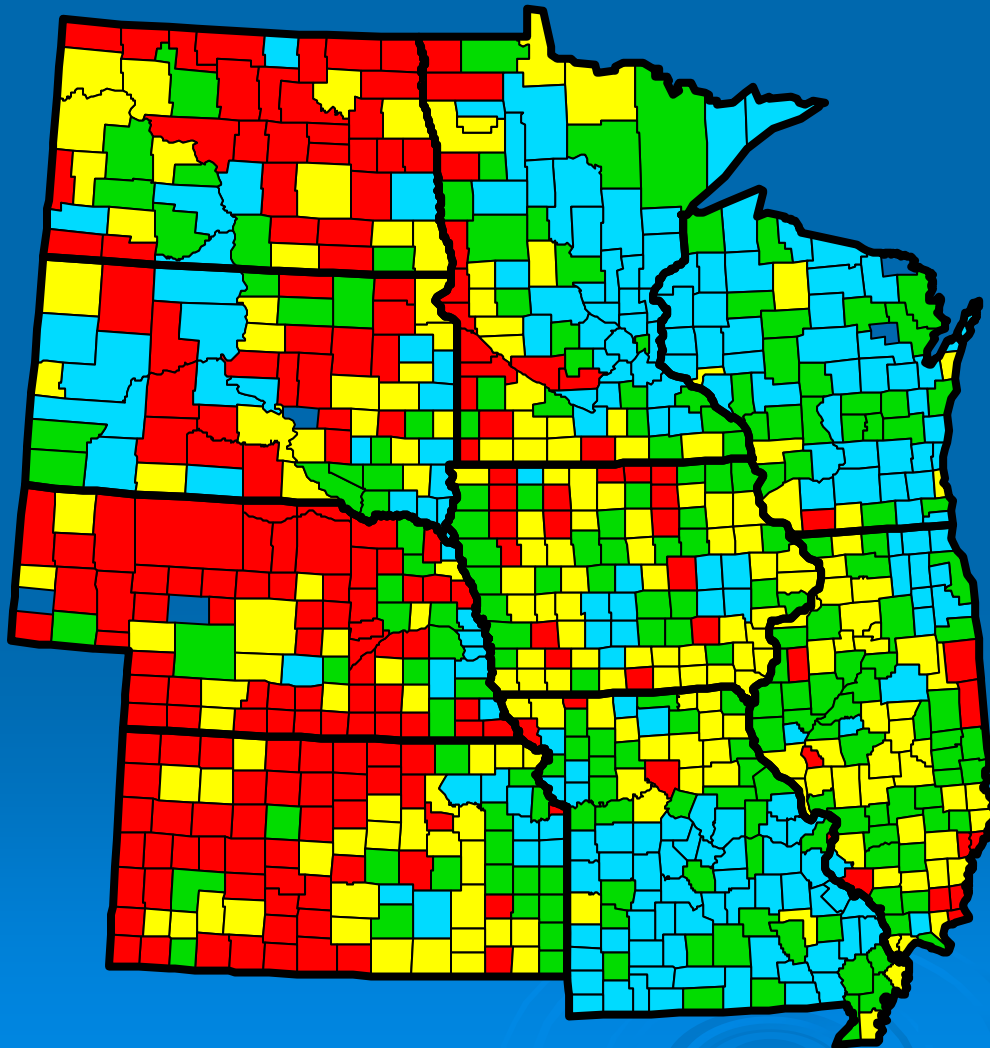
# Amenities and Economic Development

- County-level Amenity Index significantly related to county economic growth
- Amenity index-- (National Outdoor Recreation Supply Information Survey (NORSIS) data)
  - Recreation land acres
  - Recreation water acres
  - Trail miles
  - Number of swimming spots
  - State park amenities

# Amenity Index – Home Plus Nearest 4 Counties



# Total County Income Growth 1990-2001





# Impact of Water Quality Improvement Investments



An aerial photograph showing a large, dark, irregularly shaped body of water, Saylorville Lake, which occupies the right half of the frame. To the left of the lake, the land is a patchwork of agricultural fields, some appearing as light-colored rectangles and others as darker, more textured areas. A network of roads and possibly a railway line is visible, crisscrossing the landscape. In the lower-left corner, there is a small, more densely developed area that appears to be a town or village, with numerous small buildings and a more complex street pattern. The overall tone of the image is grayscale, giving it a historical or archival appearance.

**Saylorville 1990**

An aerial photograph showing a wide river flowing from the top left towards the bottom right. The river is dark and has several smaller tributaries branching off. The surrounding land is a mix of green fields, brown patches, and some small bodies of water. The overall tone is somewhat muted, with a lot of brown and green. The text "Saylorville 2002" is overlaid in the center-left area.

**Saylorville 2002**



An aerial photograph showing a large, dark, winding river delta system. The river flows from the top left towards the bottom right, where it branches out into several large, interconnected water bodies. The surrounding landscape is a mix of green fields, some brown patches, and dense forest. A road or path runs vertically along the left side of the image. The text "Saylorville 2005" is overlaid in the lower-left quadrant of the image.

**Saylorville 2005**



# Lake Restoration/Preservation

- Lake restoration efforts can be costly, involving
  - dredging
  - watershed management
- However, the benefits to Iowans can also be substantial
  - recreational benefits
  - benefits to local residents
  - non-use values
- The benefits to any restoration “program” depends upon the mix of lakes being restored *not* just on the sum of benefits from each lake



# A Lake Prioritization Analysis

## The Cost Side

- IDNR provided a list of 35 priority Lakes for possible restoration
- Preliminary lake restoration costs were estimated for each lake by IDNR and John Downing, incorporating
  - In-lake restoration costs including dredging to an average depth of 10 ft.
  - Permanent watershed protection (per acre)
  - Yearly watershed maintenance costs
- Resulting lake changes were projected assuming
  - a 70% reduction in total nitrogen, total phosphorous and suspended solids
  - a 90% reduction in cyanobacteria
  - corresponding changes in Secchi depth, chlorophyll, and total phytoplankton

# A Lake Prioritization Analysis

## The Benefits Side

- The Total Benefits from lake restoration depend upon the “package” lakes being improved
- We narrowed the set of “packages” to those that would have a Total Cost of \$10 million
- This still includes over 16000 “packages”
- Total Benefits include only the “recreational” benefits

# Single Lake Rankings

## Sorted by Benefit/Cost Ratio

TNB Ranking	Lake	TNB	TB	TC	TB/TC
3	<b>Hickory Grove</b>	275.94	277.80	1.86	149
14	<b>Red Haw</b>	54.65	55.10	0.45	122
12	<b>Kent Park</b>	61.28	61.99	0.71	87
11	<b>Lake Anita</b>	68.81	69.67	0.86	81
13	<b>Springbrook</b>	60.69	61.79	1.10	56
9	<b>Lake Ahquabi</b>	86.91	88.55	1.64	54
21	Hannen	25.45	25.95	0.49	53
18	Lake of the Hills	39.69	40.48	0.79	51
25	Central Park	22.23	22.75	0.52	44
6	Lake Geode	161.34	166.11	4.77	35
1	Big Creek	733.74	755.76	22.03	34
19	<b>Viking</b>	30.04	30.99	0.95	33
4	Lake McBride	218.18	226.21	8.03	28
2	Brushy Creek	490.70	517.20	26.50	20



# Storm Lake Restoration Impacts

## Lake Dredging and Watershed Protection

### Inducing New Investment

- Lodge
- Campgrounds
- Condos

### Projected Increased Visitation and Spending

- 148,000 new visitors
- \$10.7 million new income
- 690 jobs, 25 new businesses



# Additional Natural Resource Investments Effects

## ➤ Parks

- As with lakes, distance and facilities affect park usage, expenditures, and benefits

## ➤ Trails

- More miles, more usage
- Proximity to population centers

## ➤ Unfunded REAP projects

# Conclusions

- Outdoor recreation is important to Iowans
- Outdoor recreation generates \$billions in spending and many jobs
- Recreation generates economic benefits (willingness to pay) beyond spending
- Recreation opportunities important for quality of life and retaining workers
- Provides health benefits and family-friendly opportunities
- New Investments to improve environment generates economic and quality of life benefits



<u>Variable</u>	<u>Qualitative Sign</u>
Price (Travel Cost)	-
Log(Acres)	+
Ramp	+
State Park	+
Facilities	+
Wake	+